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Case Report

Electric scooter-related triple cervical artery dissection ☆

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ABSTRACT

A 34-year-old female presented to the emergency department with neck pain, dysphonia and dysphagia ten days after a fall from an electric scooter. Subsequent computed tomography of the neck revealed bilateral vertebral artery and unilateral internal carotid artery non-occlusive dissections, which were managed with antiplatelet therapy. This case describes mechanisms of injury, clinical presentation, imaging appearances, and subsequent management of cervical artery dissection.

Introduction

This case illustrates a clinically significant pathology in a patient following a fall from a moving electric scooter. Electric scooters are an increasingly common mode of transport in urban settings. Triple cervical artery dissection is rare and can be associated with significant morbidity.

Case report

A 34-year-old female presented to the emergency department with neck pain, dysphonia and dysphagia ten days after a fall from an electric scooter.

She reported falling from an electric scooter ten days prior to presentation, while travelling at approximately 30km/h

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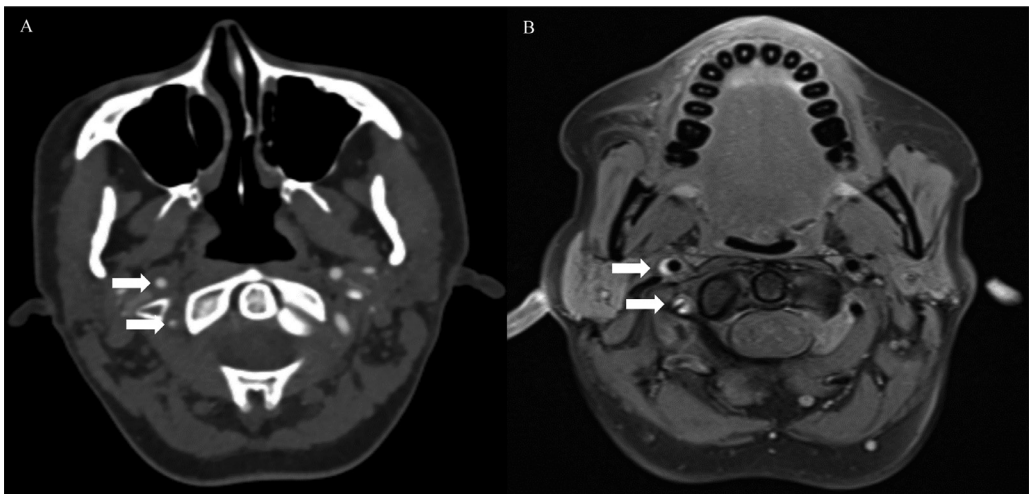

Fig. 1 – (A) CT angiogram of the neck demonstrates segmental stenosis and concentric mural thickening of the distal cervical segment of the right internal carotid artery and second segment of the right vertebral artery. (B) T1-weighted fat-saturated MRI of the neck demonstrates corresponding intramural T1 hyperintense signal within the distal right internal carotid and right vertebral arteries, in keeping with intramural hematoma.

while wearing a helmet, with direct impact to her chin. This was followed by immediate onset of neck pain which persisted. In addition, the patient reported developing new dysphagia and dysphonia approximately 5 days post-trauma which had gradually worsened until presentation. The patient had no past medical or surgical history, no known drug allergies and was not taking any medications. At presentation, vital signs, including blood pressure, were normal. On examination, the patient had midline neck tenderness. Neurological examination revealed hoarseness and uvular deviation consistent with a right vagus nerve palsy and tongue deviation consistent with a right hypoglossal nerve palsy. Fiberoptic laryngoscopy confirmed a partial right vocal cord paralysis.

Cervical spine x-rays were normal. Computed tomography (CT) of the neck and thorax was performed to investigate the cause of the cranial nerve palsies (Figs. 1A and 2A). This demonstrated non-occlusive stenoses of the right distal cervical segment of the right internal carotid artery and bilateral vertebral arteries. Magnetic resonance imaging (MRI) of the neck (Figs. 1B and 2B), including a T1-weighted fat-saturated sequence, demonstrated intramural T1 hyperintense signal within the distal right internal carotid and bilateral vertebral arteries, in keeping with intramural hematoma. This confirmed the diagnosis of triple cervical artery non-occlusive dissection. MRI of the brain revealed no infarct. The patient was treated with antiplatelet agents. Four-month interval MRA of carotid and vertebral arteries demonstrated partial recanalization of the non-occlusive dissections without pseudoaneurysm formation.

Discussion

Electric scooters are an increasingly common mode of transport, particularly in the urban setting, and are associated with increased risk of high energy trauma [1,2]. Injury rates of between 115 and 250 per million trips and fatality rates of 19 per million trips have been described [3,4]. The most common associated injuries are upper extremity (54%), lower extremity (47%) and head and neck (43%) [4].

Cervical artery dissection is defined by hematoma in the wall of a cervical artery with the formation of a dissection flap. It has an estimated incidence of 2.6-3 per 100,000 per year [5,6]. Most cases occur in a single cervical artery and only 2-4% of all cervical artery dissections are triple or quadruple vessel [7]. Risk factors for multi-vessel dissection are present in over 70% of cases, most frequently trauma, recent infection and fibromuscular dysplasia [7,8]. Mechanisms of traumatic cervical artery injury include hyper-extension with head rotation or lateral flexion, vessel laceration from bone fracture and direct vessel impact [9,10]. Distal ischemic stroke or TIA complicates multi-vessel dissection in 56%-74% [7,8]. Common local symptoms, predominantly due to compression of adjacent structures, include headache, neck pain, and Horner's syndrome [5,7,11]. Cranial nerve palsies occurred in 4% cases of multi-vessel cervical artery dissection in one study [5]. Interestingly, internal carotid artery dissections that exhibit lower cranial nerve paralysis are less often associated with cerebral ischemia [12].

Diagnostic criteria for arterial dissection include intramural hematoma, a dissecting aneurysm, a long tapering stenosis, an intimal flap, a double-lumen, or an occlusion >2cm above the carotid bifurcation revealing a dissecting aneurysm [13,14]. Recent ESO guidelines recommend antiplatelet or anticoagulant therapy in the acute phase of symptomatic cervical artery dissection [15]. The vast majority of patients with triple or quadruple vessel dissection have no or minor disability at follow up (modified Rankin score 0-1) [7,8]. Stenotic and near-occlusive dissections tend to heal with minor residual wall abnormalities. If early recanalization occurs, the outer diameter frequently remains smaller than that of the normal contralateral vessel [9].

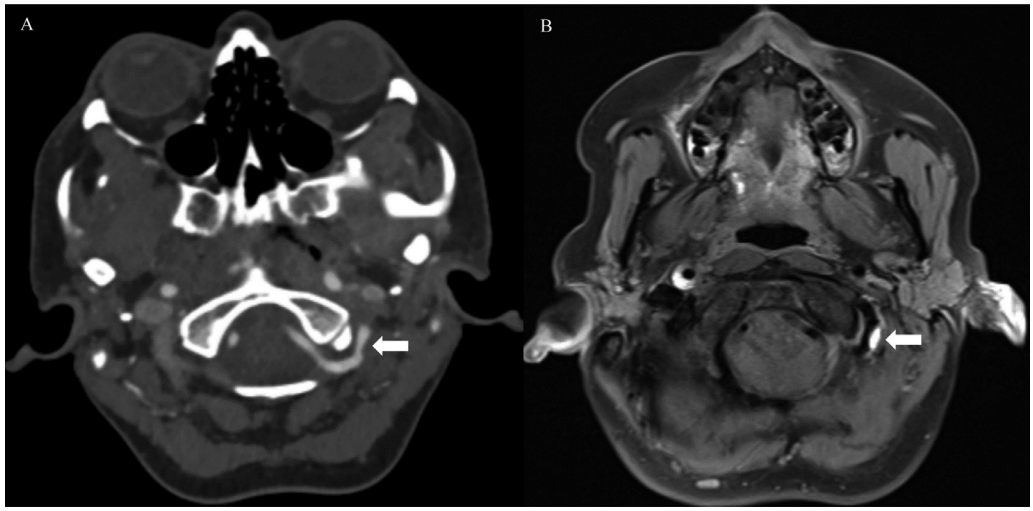

Fig. 2 – (A) CT angiogram of the neck demonstrates segmental stenosis and concentric mural thickening of the third segment of the left vertebral artery. (B) T1-weighted fat-saturated MRI of the neck demonstrates corresponding intramural T1 hyperintense signal within the third segment of the left vertebral artery, in keeping with intramural hematoma.

In summary, this case describes the risk factors, clinical symptoms, and signs, imaging appearances, including diagnostic criteria, and subsequent management of traumatic triple cervical artery non-occlusive dissection.

Authors' contribution

DG is primary author and responsible for drafting the manuscript.

JH is responsible for assisting in drafting of manuscript and manuscript review.

MM is responsible for manuscript review.

EK is the supervisor and responsible for idea generation.

Patient consent

Informed consent was obtained from the patient involved in this case.

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